Projected Socioeconomic Effects of Various Levels of Timber Outputs from the Okanogan National Forest

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Projected Socioeconomic Effects of Various Levels of Timber Outputs from the Okanogan National Forest

A. Introduction

This analysis is intended to be used by the forest planning interdisciplinary (ID) team to estimate the socioeconomic effects of various levels of timber outputs from the Okanogan National Forest (ONF). Since the alternatives are not yet fully formed, this analysis includes working graphs which relate various economic and demographic variables to minimum, intermediate and maximum levels of timber outputs, projected over five decades (periods) (1981-90, 1991-2000, 2001-2010, 2011-2020, 2021-2030). The Forest plan ID team can use these graphs to determine the economic and demographic effects of the fully-formed alternatives. Note that the timber outputs and all of the economic and demographic variables projected in the following tables and figures are based on average yearly levels of timber output, and employment, income, unemployment and population, over each time period, or decade. Also note that the graphs for the economic and/or demographic effects resulting from changes in ONF timber outputs (Figures, 1, 3 and 7) apply to any combination of ONF watershed timber outputs. For this analysis, ONF timber outputs were grouped by the Methow Valley half of the ONF (10 watersheds), and the rest of the ONF watersheds in Okanogan County (4 watersheds), or for the total ONF. (see appendix, Table 1A, for a listing of ONF watersheds). This occurs because each graph has lines plotted that are dependent on employment: wood consumption ratios that remain unchanged during each decade, regardless of changes in ONF timber outputs. The employment ratios determines the slope of the lines. Each period (decade) has a different line because the ratios change by decades (with fewer people required to produce per MMBF in the future due to increased worker productivity. Therefore, each of the ONF graphs can be used for all ONF segments (or combinations of watersheds). All of the quantitative projections are based on a model presented in the appendix that was specifically developed to estimate socioeconomic effects resulting from various levels of timber outputs. The appendix presents a detailed description of the timber outputs, assumptions and methods used for this model. The key source document for baseline data was A Social and Economic Assessment of Okanogan County (SEA) (Hutchins, June 1981).

Then a generalized discussion of changes in social groups follows based on Social Values and Lifestyles in Okanogan County (SNA) (Hutchins, February 1981). Since this study did not develop estimates of population by social groups, this discussion is not specific to alternative levels of outputs from the ONF.

Another key source document for this analysis is Methods for Estimating Socioeconomic Effects, (Hutchins, March 81), which includes the Forest planning ID team's decision document on estimating socioeconomic effects.

Special thanks and credit to my wife Becky, who helped brainstorm and develop the quantitative model, and for plotting the graphs.

B. Results of the Modeling and Analysis

1. Economic Effects:

Table 1 and Figures 1 and 2 show the projected forest industry employment in Okanogan County resulting from various levels of timber output from the ONF. For example, total forest industry employment in period one (1981-1990) ranges from a low of 655 workers with no ONF timber outputs, to 1,465 workers under an assumption of "maximum timber outputs, even flow."

Table 2 and Figures 3 and 4 show the total forest industry wages (in constant 1979 dollars) for the five projected decades. These wages reflect the trends in employment discussed above.

Table 1: Projected Forest Industry Employment Added By Wood Consumption[1/]

Alternative	Custodial					Current					Max. Timber				
Period	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
B.F.[3] / Emp.															
ONF, County						39 / 249	21 / 118	39 / 190	50 / 286	36 / 127	32 / 202	30 / 165	96 / 463	71 / 293	76 / 271
ONF, Method						42 / 270	60 / 330	43 / 206	31 / 127	45 / 163	95 / 608	121 / 674	88 / 417	81 / 332	107 / 380
ONF, Total[2]						81 / 519	81 / 448	81 / 396	81 / 333	81 / 290	126 / 810	151 / 839	184 / 880	152 / 625	183 / 651
All Other	102 / 655	103 / 571	113 / 546	116 / 477	120 / 430	102 / 655	103 / 571	113 / 546	116 / 477	120 / 430	102 / 655	103 / 571	113 / 546	116 / 477	120 / 430
Total, All	102 / 655	103 / 571	113 / 546	116 / 477	120 / 430	183 / 1174	184 / 1019	194 / 938	197 / 810	201 / 720	228 / 1465	254 / 1409	297 / 1426	268 / 1102	303 / 1083

Notes: [1/] Assumes all timber made available for sale will be sold and processed.

[2/] Assumes total employment from O.N.F. Timber will be captured by county labor force (i.e.: no in-migration stimulated by wood consumption).

[3/] Board feet in millions

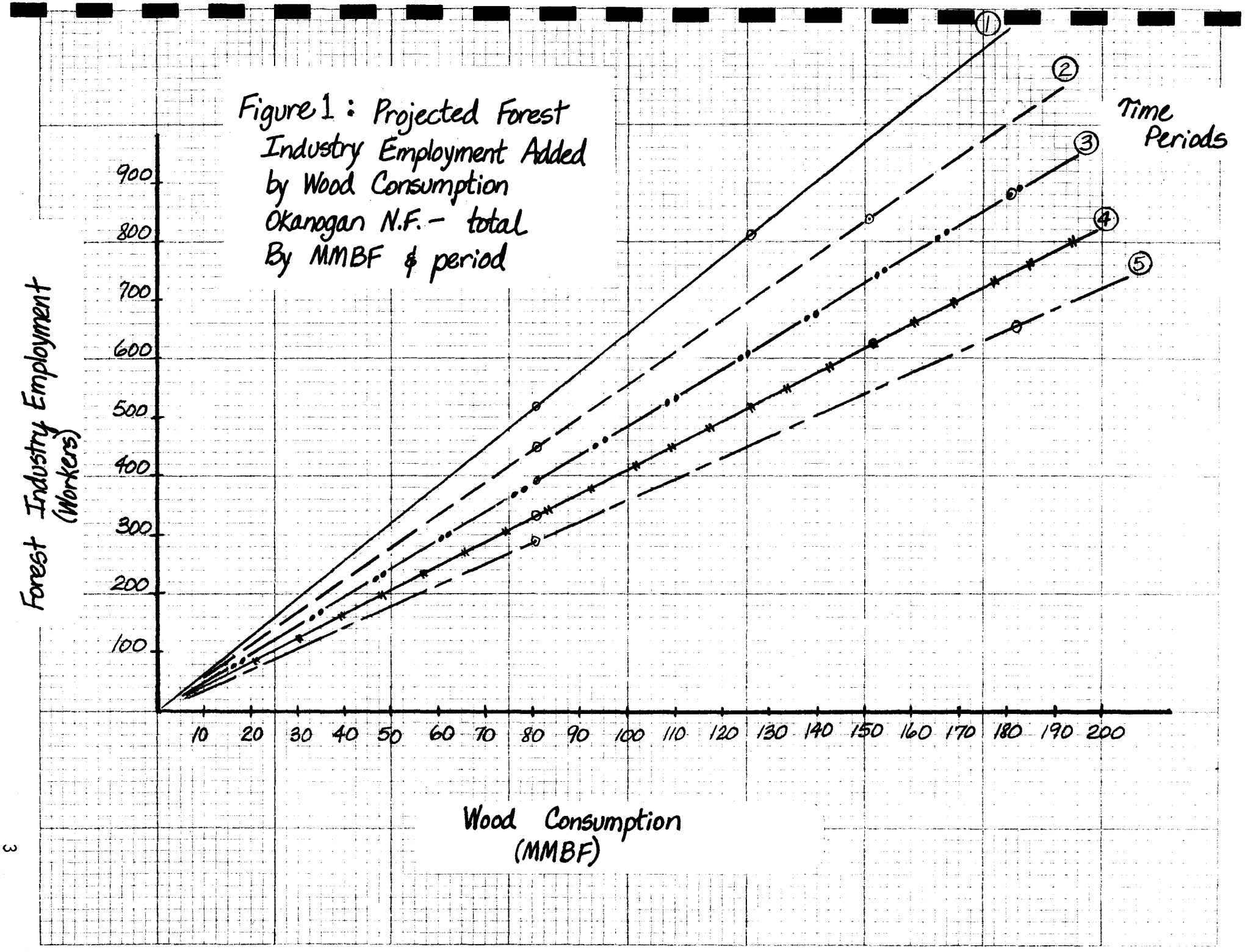


Figure 1: Projected Forest Industry Employment Added by Wood Consumption Okanogan N.F. – total By MMBF & period
Time Periods
1
2
3
4
5
Forest Industry Employment (Workers)
900
800
700
600
500
400
300
200
100
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Wood Consumption (MMBF)

Figure 2: Projected Forest Industry Employment added by Wood Consumption Okanogan County - total By MMBF & period

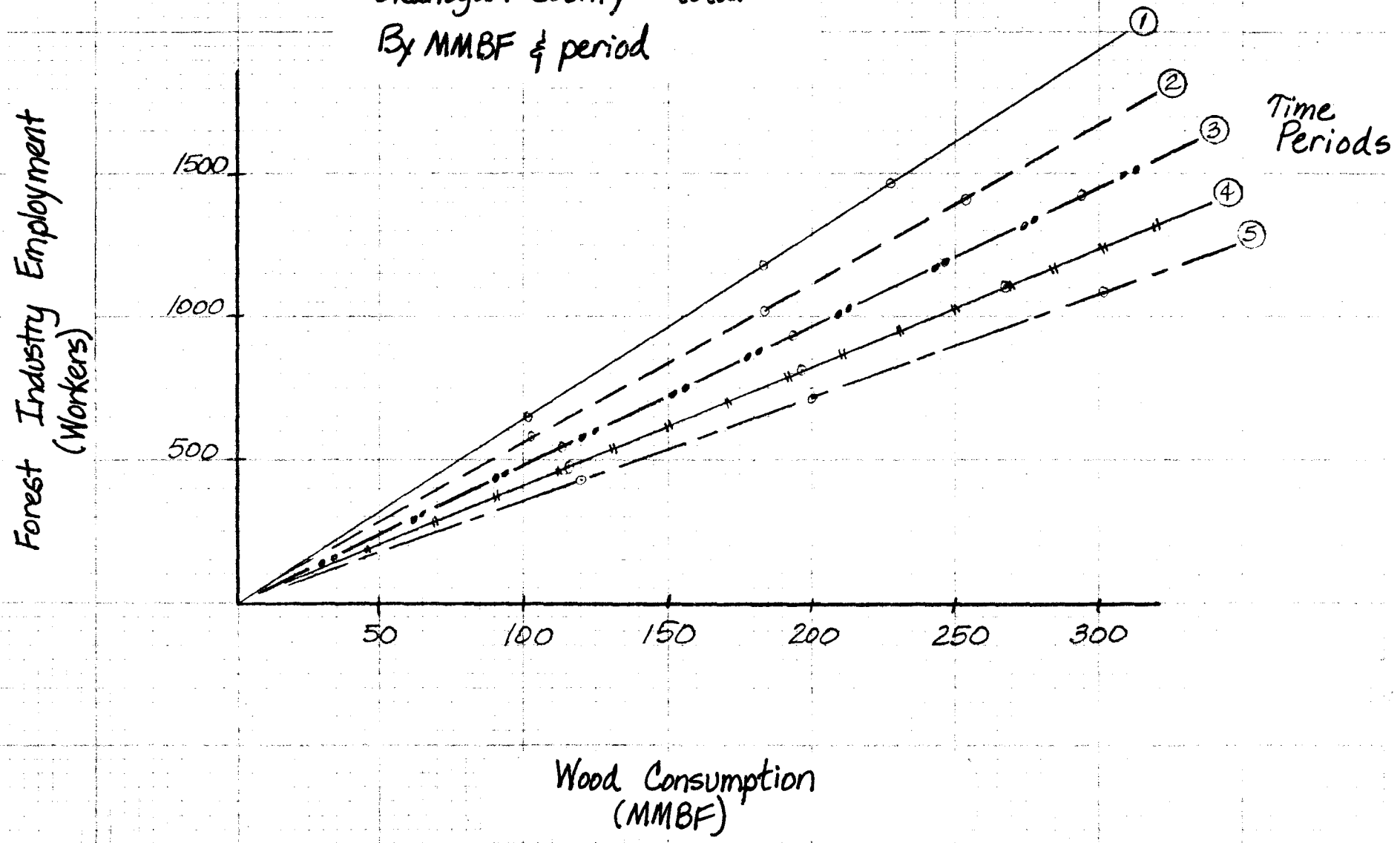


Table 2: Projected Total Forest Industry Wages Added By Wood Consumption

Alternative	Custodial					Current					Max. Timber				
Period	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
B.F.[1] / Wages[2]															
ONF, County	0	0	0	0	0	39 4299	21 2328	39 4281	50 5456	36 3841	32 3449	30 3246	96 10431	71 7742	76 8171
ONF, Methow	0	0	0	0	0	42 1601	60 6304	42 4553	31 3344	45 4905	95 10360	121 13270	86 9393	81 8726	107 11538
ONF, Total	0	0	0	0	0	81 8850	81 8892	81 8894	81 8800	81 8747	126 13809	151 16516	182 19824	152 16518	182 19709
All Other	102 11181	103 11239	113 12289	116 12601	120 12956	102 11181	103 11239	113 12289	116 12601	120 12956	102 11181	103 11239	113 12289	116 12601	120 12956
Total, All	102 11181	103 11239	113 12289	116 12601	120 12956	183 20031	184 20071	194 21123	197 21400	201 21702	228 24899	254 27755	295 32112	268 29119	302 32665

Notes: 1/ Board feet in millions.

2/ Wages in thousands of 1979 dollars.

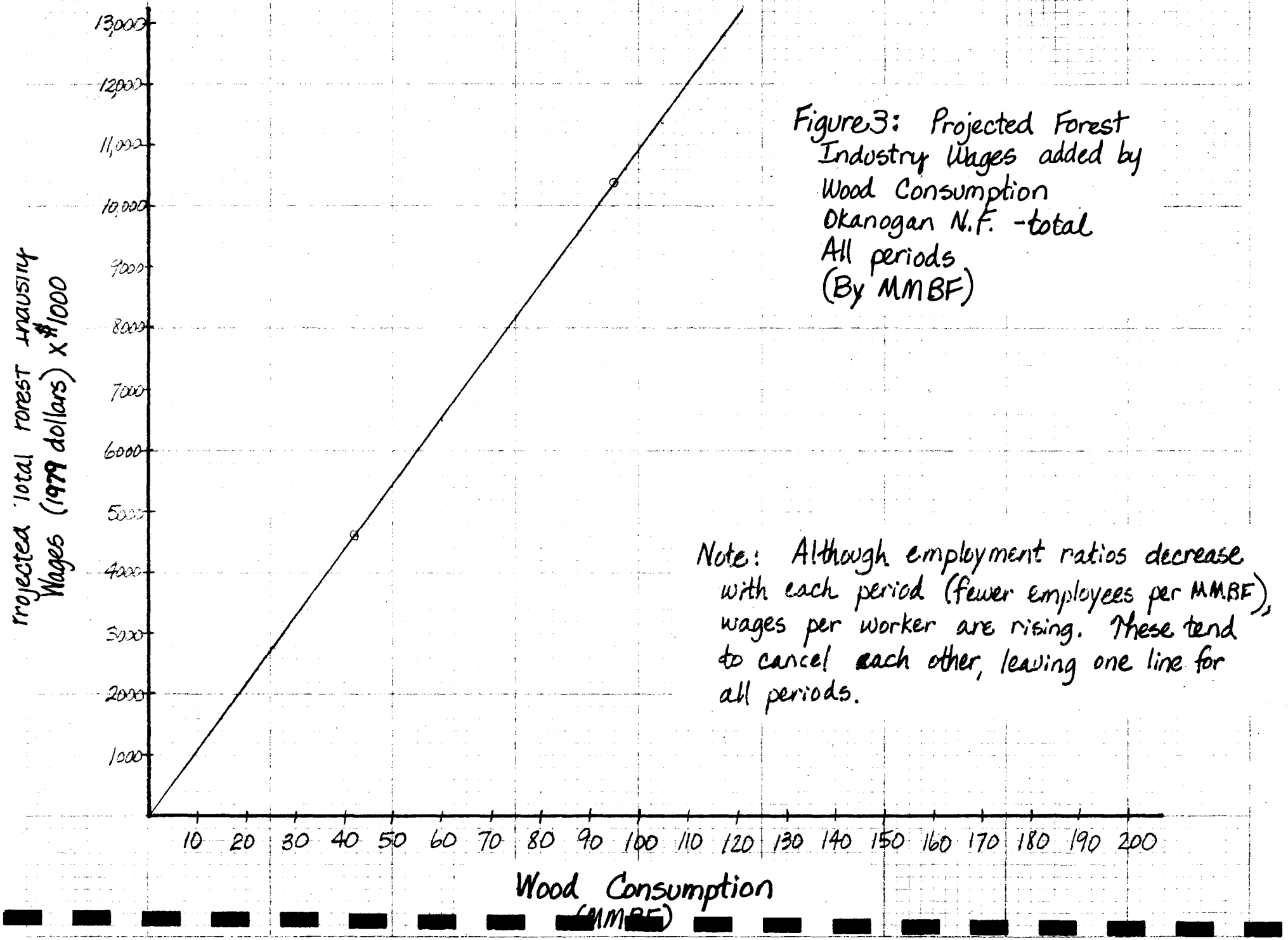


Figure 3: Projected Forest Industry Wages added by Wood Consumption Okanogan N.F. -total All periods (By MMBF)

Note: Although employment ratios decrease with each period (fewer employees per MMBF), wages per worker are rising. These tend to cancel each other, leaving one line for all periods.

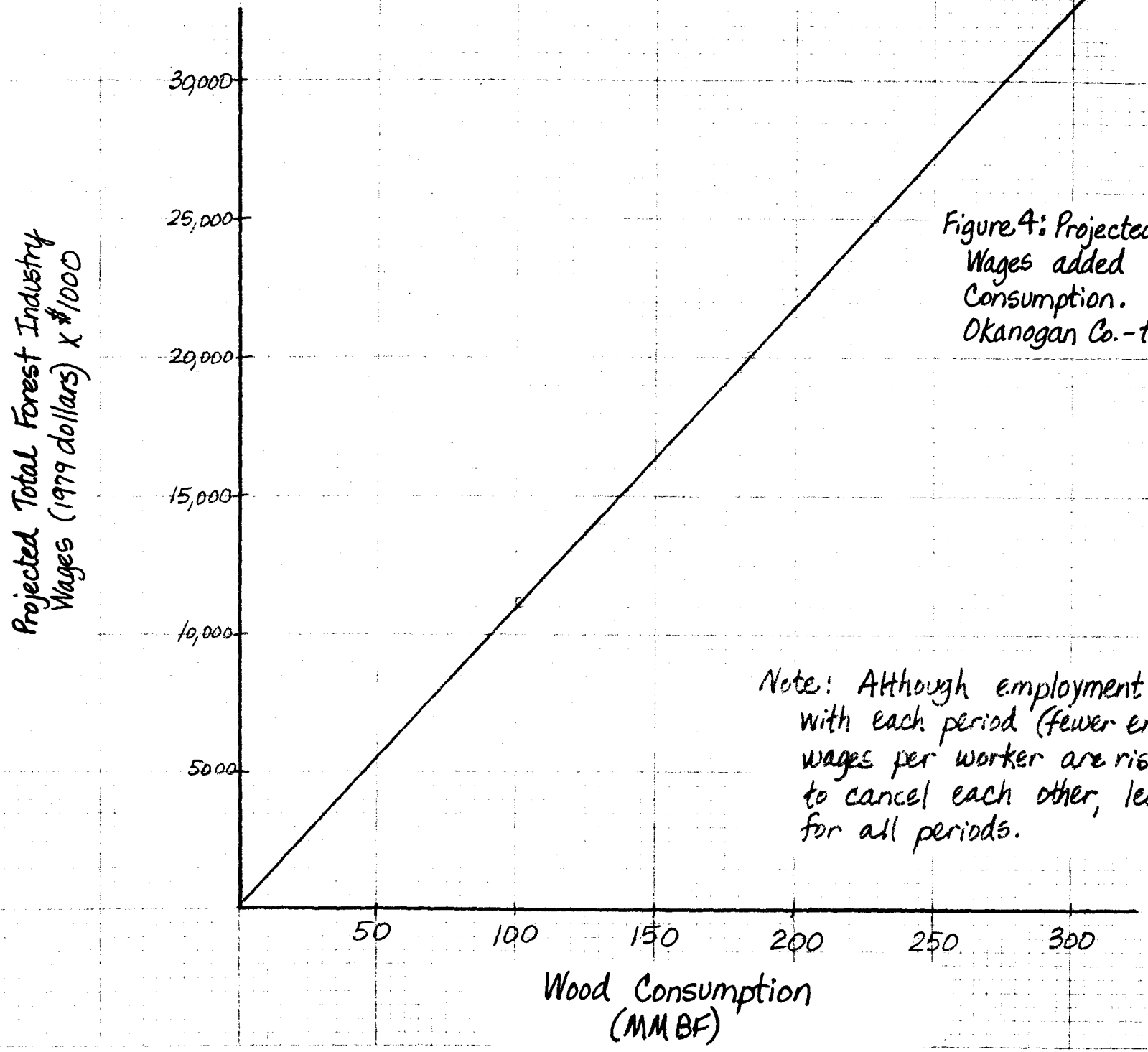


Figure 4: Projected Forest Industr
Wages added by Wood
Consumption. (By MMBF)
Okanogan Co.-total (All period

Note: Although employment ratios decrea
with each period (fewer employees per MM
wages per worker are rising. These ten
to cancel each other, leaving one line
for all periods.

B. Results of the Modeling and Analysis (cont'd)

Table 3 and Figure 5 shows the secondary non-basic employment added from basic forest products personal income. The concept of basic/non-basic sectors of the economy is explained in the Economic/Demographic Assessment Manual (Chalmers and Anderson, November 1977) as well as later supplemental studies such as Spatial Interaction and the Economic Hierarchy in the Western United States (USDI, Bur. of Rec., Undated). In its simplest form, basic sectors of the local economy (Okanogan County) are those sectors or portions of sectors wholly or partly dependent on outside market forces. For example, the demand for forest products depends on underlying regional demands for such things as housing. Non-basic sectors depend on local county-wide forces at least in part. For example, local services such as restaurants depend to an extent of infusions of wages into the local economy from forest products industries, which in turn depend more on regional economic forces (basic forces). Thus the services sector in part depends on both non-basic and basic market forces. The economic model in the appendix attempts to delineate and project based on these differences.

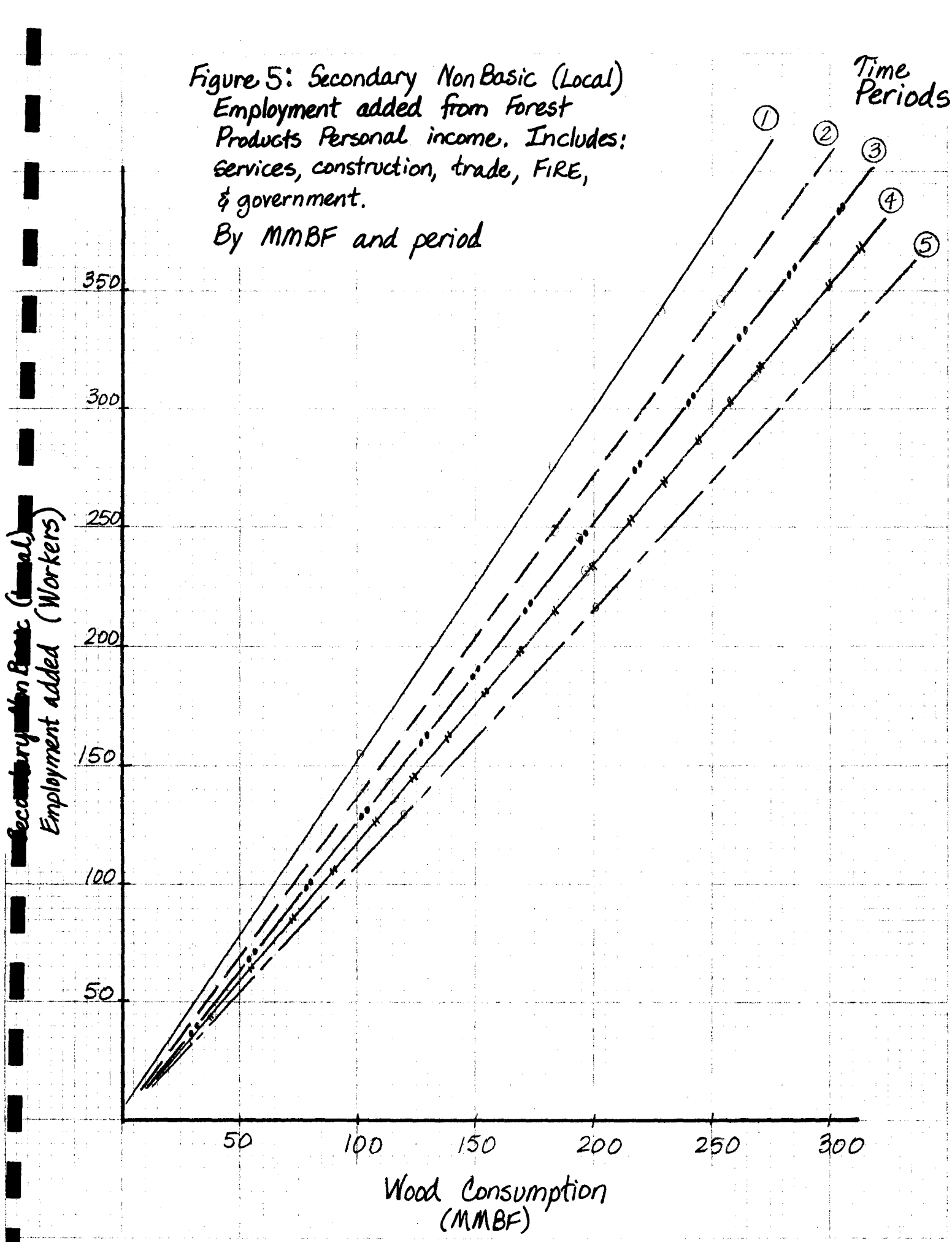
Table 3: Secondary Non-Basic (local) Employment Added From Basic (non local) Forest Products Personal Income, By Sector[1/]

Alternative	Custodial					Current					Max. Timber				
Sector/Period	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Services	36	34	35	33	32	64	60	60	57	54	80	83	91	77	81
Construction	15	13	13	12	11	26	23	22	20	18	32	32	33	27	27
Trade	40	41	45	47	49	72	72	78	80	83	89	100	118	109	125
Fire[2/]	15	15	17	17	18	26	26	28	29	30	32	36	43	39	45
Government	49	38	33	27	19	88	68	58	46	32	109	95	87	62	48

Notes: [1/] Non-basic sectors of the economy are those sectors within the zone of influence (Okanogan County) which are directly effected by additions on reductions in money flows (dollars from forest products as stimulated by roundwood stumpage). Basic sectors are unaffected by local market conditions; they are dependent on market forces outside of the primary zone of forest influence (i.e.: Okanogan County).

[2/] Finance, Insurance and Real Estate.

Figure 5: Secondary Non Basic (Local) Employment added from Forest Products Personal income. Includes: services, construction, trade, FIRE, & government.
By MMBF and period



B. Results of the Modeling and Analysis (cont'd)

Table 4 and Figure 6 project the county's employment structure by sector, presents potential labor force levels, and from this ultimately developes numbers and rates of unemployment directly tied to various levels of timber outputs in the future (by decades) from the Okanogan National Forest (ONF). For example, under "custodial" management with no ONF timber outputs, period one unemployment reaches 16 percent. By comparison, Table 48 in the SEA projects an average yearly unemployment rate of 11.4 percent for this decade. Under "current" levels of outputs the unemployment rate is projected at 11.5 percent during this decade. With "maximum, even flow" outputs from the ONF, overall county unemployment is projected to fall to 9.1 percent. This indicates the relative sensitivity of the combined primary and secondary economic sectors in Okanogan County to changes in timber outputs from the ONF.

Table 4: Projected Employment Structure by Sector, Total Employment, Potential Labor Force, Number Unemployed and Unemployment Rate (%)

Alternative	Custodial					Current					Max. Timber				
Sector/Period	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Agriculture	1475	1275	1150	975	813	1475	1275	1150	975	813	1475	1275	1150	975	813
Non-Ag., Self Emp.[1/]	925	900	900	900	900	925	900	900	900	900	925	900	900	900	900
Other Non-Ag.	525	575	625	675	725	525	575	625	675	725	525	575	625	675	725
Construction	684	762	793	854	907	695	772	802	862	914	701	781	813	869	923
Forest Products	655	571	546	477	430	1174	1019	938	810	720	1465	1409	1426	1102	1083
Trade	2833	3861	4723	5698	6646	2865	3893	4756	5731	6680	2882	3921	4796	5760	6722
Fire[2/]	259	312	365	418	472	270	323	376	430	484	276	333	391	440	499
Services[3/]	2063	3569	4654	6018	7317	2091	3595	4679	6042	7339	2107	3618	4710	6062	7366
Government	2723	3163	3529	3940	4336	2762	3193	3554	3959	4349	2783	3220	3583	3975	4365
Total Employment[4/]	12142	14988	17285	19955	22546	12782	15545	17780	20384	22924	13139	16032	18394	20758	23396
Potential Labor Force	14447	16922	18981	21630	24227	14447	16922	18981	21630	24227	14447	16922	18981	21630	24227
Number Unemploy.	2305	1934	1696	1675	1681	1665	1377	1201	1246	1303	1308	890	587	872	831
Unemploy. Rate (%)	16.0	11.4	8.9	7.7	6.9	11.5	8.1	6.3	5.8	5.4	9.1	5.3	3.1	4.0	3.4

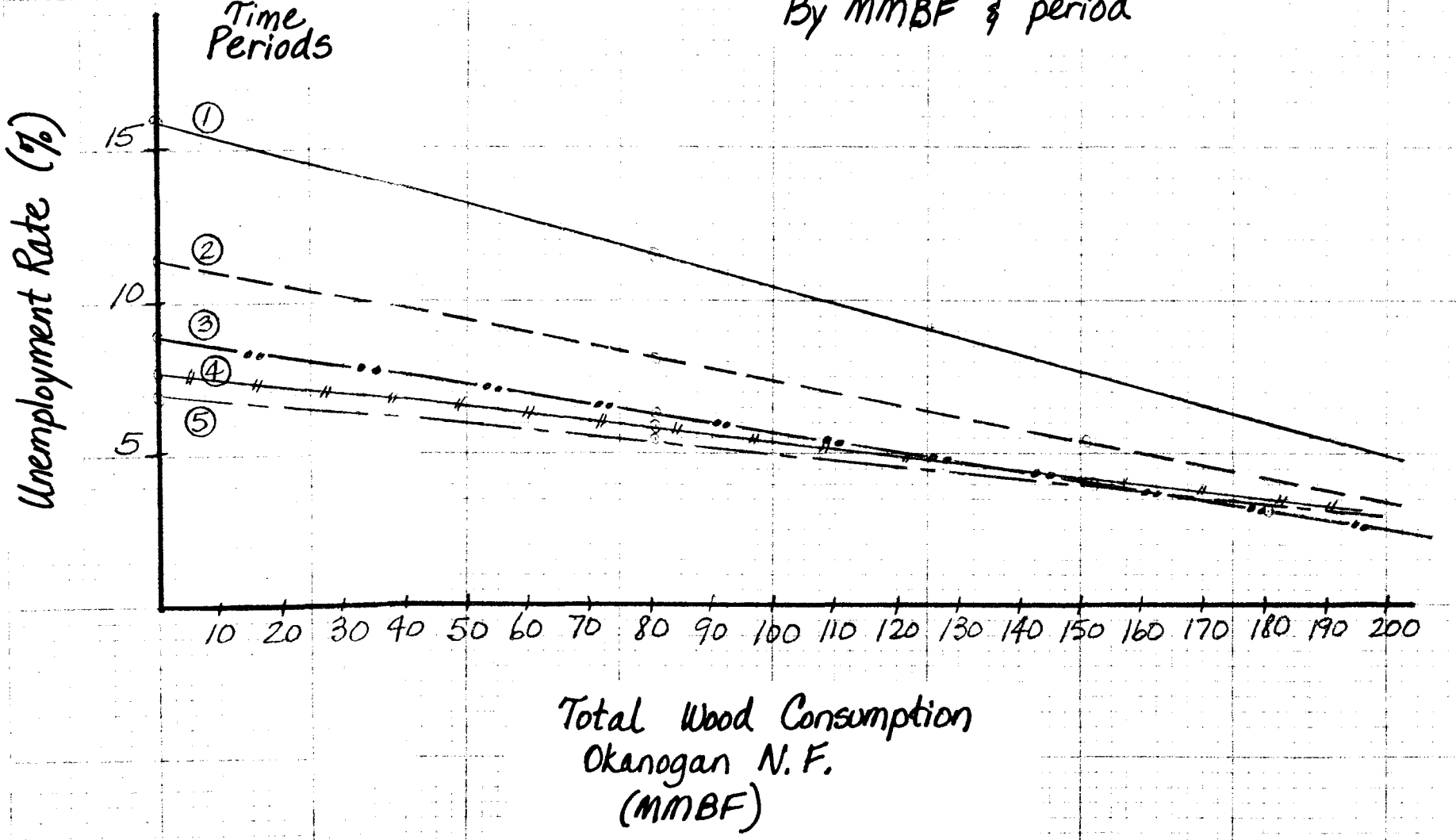
Notes: 1/ Includes individual proprietors

2/ Finance, Insurance and Real Estate

3/ Includes recreation

4/ An assumption in calculating total employment by sector is that one person does not hold two jobs. Double counting probably does occur, especially in the agri., forest prod., trade and services sectors, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic. Therefore, estimates of unemployment may be understated to some degree.

Figure 6: Projected unemployment rate for Okanogan County as a result of wood consumption from Okanogan N.F. By MMBF & period



2. Demographic Effects

Table 5 and Figures 7 and 8 show the numbers of population directly effected by various levels of timber outputs from the ONF. These people are the forest industry workers and their families. These projections assume that baseline population projections for the county overall will remain unchanged due to changes in timber output from the ONF. In other words, that the forest industry work force in the county will not change in response to changes in timber output. This stability in the work force is substantiated by interviews conducted for the SNA, and indirectly by Bolsinger (1975).

Table 5: Projected Total Population Effected by Wood Consumption[1/]

Alternative	Custodial					Current					Max. Timber				
Period	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
B.f.(2) / Pop(3)															
ONF, County	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	39 / 678	21 / 312	37 / 498	30 / 522	30 / 315	32 / 550	25 / 435	76 / 1200	76 / 791	76 / 669
ONF, Metraw	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	42 / 734	60 / 872	44 / 524	31 / 320	45 / 402	35 / 1652	121 / 1779	85 / 1080	81 / 840	107 / 945
ONF, Total	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	81 / 1412	81 / 1184	81 / 1010	81 / 842	81 / 717	126 / 2202	151 / 2214	161 / 2280	157 / 1631	182 / 1614
All other	102 / 1783	103 / 1506	113 / 1413	116 / 1206	120 / 1061	102 / 1789	103 / 1506	113 / 1413	116 / 1206	120 / 1061	102 / 1783	103 / 1506	113 / 1413	116 / 1206	120 / 1061
Total, All	102 / 1783	103 / 1506	113 / 1413	116 / 1206	120 / 1061	183 / 3195	184 / 2690	194 / 2423	197 / 2048	201 / 1778	228 / 3985	254 / 3720	274 / 3693	273 / 2787	302 / 2675

Note: 1/ Assumes that one person does not hold two or more jobs. Dougle counting probably does occur, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic.

2/ Board feet in millions.

3/ Assumes baseline population projections for the county will remain unchanged due to changes in wood output. I.e.: A stable labor force that doesn't increase or decrease from changes in wood consumption.

Figure 1: Total Population Effected by Wood Consumption from Okanogan N.F. By MMBF & period

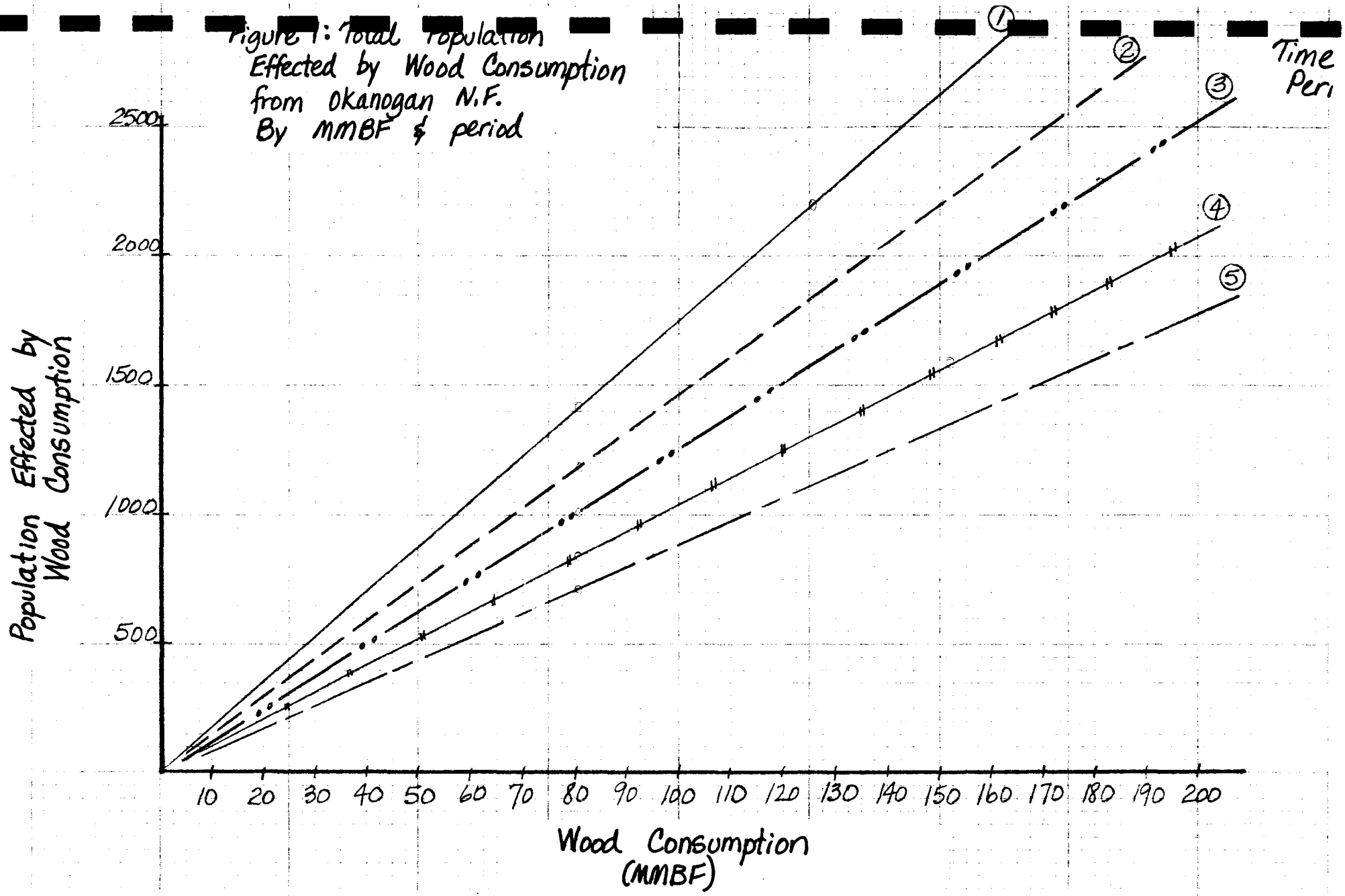
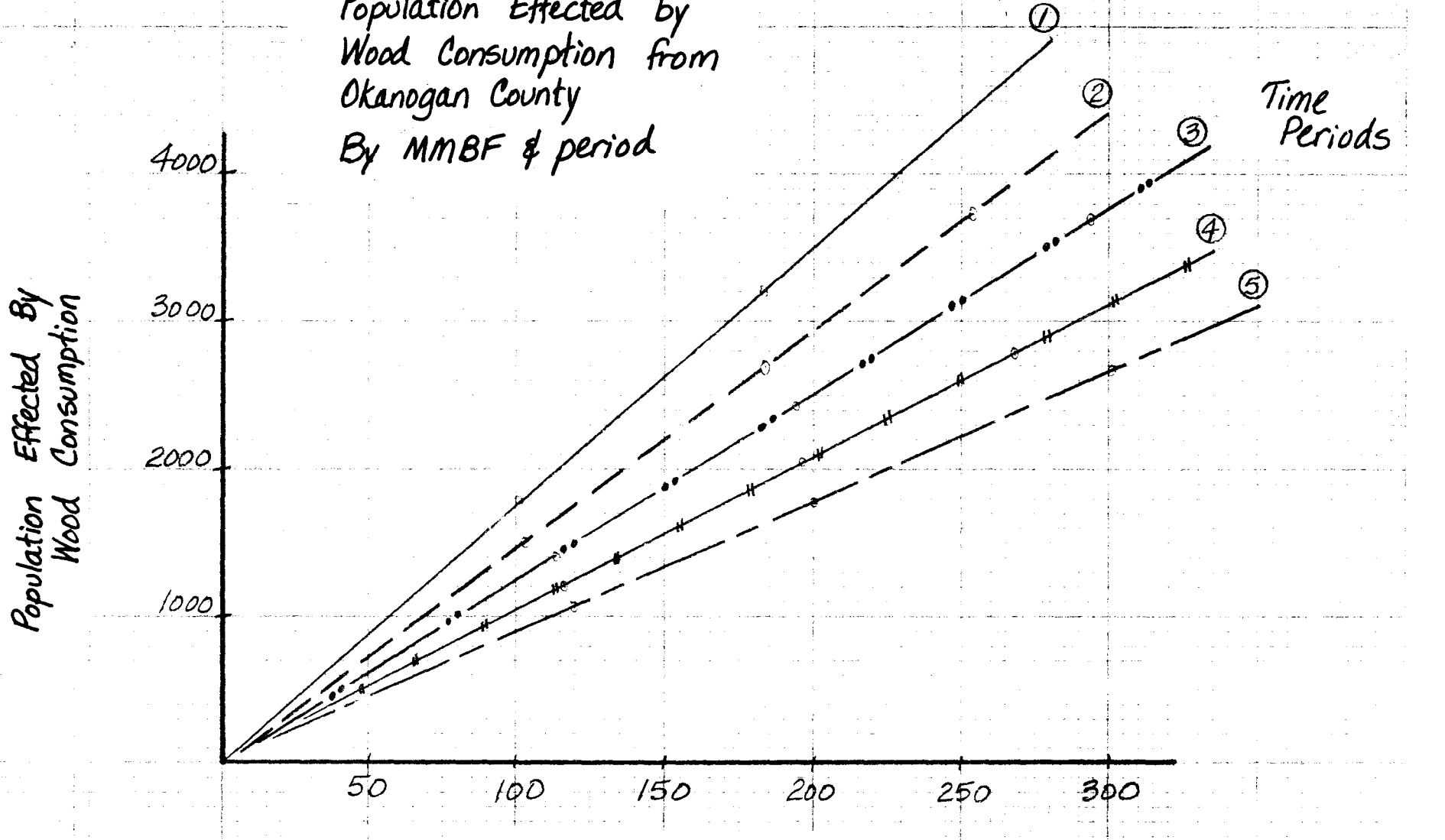


Figure 8: Projected Total Population Effected by Wood Consumption from Okanogan County By MMBF & period



3. Social Effects

a. Social Reference Groups, Background -

The "Affected Environment" section of the Forest Plan write-up and the SNA identify some varying lifestyles and values by various social groups currently living in Okanogan County. The majority of the forest industry workers have been old-timers, or descendants of original pioneers. These people have strong ties to the resource base, many having worked most of their lives in agriculture and/or the forest industries. Their employment in the forest industries has been especially pronounced at the Twisp Mill, in the Methow Valley. However, these residents are generally approaching retirement and they will be replaced during the next decade by newcomers who also have close ties to the resource base. This replacement of old-timers/pioneers by newcomers/primary resource based has already progressed at a more rapid rate in the Omak Mill. But these newcomers at both locations have readily embraced the traditional, conservative values they found here among the old-timers/pioneers. These newcomers have also generally retained more relatively "urban" values, and tend to be more accepting of the mixing and turnover in values and lifestyles generally associated with more urban lifestyles. While the old-timers/pioneers have extended families based on mutual support exclusive of "outside" groups, these newcomers tend to reach outside of their numbers if and when support is needed. These newcomers will become the "old-timers" during the second time period (1990-2000).

b. Projected Changes in Social Groups -

The primary force which will bring changes in reference groups is changes in population size, density and distribution. The population tied to the mills is expected to continue to be concentrated in the valley-bottoms in the Okanogan and Methow Valleys. Most growth in these valleys will probably result from in-migration by newcomers, so the relative position of old-timers/pioneers will decline, even though some of these newcomers will become old-timers, adopting similar "traditional" rural lifestyles and values.

Since future population changes will also bring newcomers over future decades with more urban values, the relative importance of the old-timer/primary resource based groups will diminish. Intergroup conflicts among the oldtimer/resource based mill workers and these newer, less traditional arrivals should continue into the 1990's, and then probably diminish as the old-timers become less predominant. Thus after period two, "traditional" values will be lost as well as close extended family ties.

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D. Appendix: Step-By-Step Process for Estimating Socioeconomic Effects of Varying ONF Timber Outputs

Step 1: Summarize forest plan timber alternatives by three levels of timber outputs (Tables 1a-c):

Custodial Alternative - which basically involves custodial resource protection, without commercial timber outputs from the Okanogan National Forest (ONF). This is considered the "minimum."

Current Alternative - which involves the application of new timber inventory and management prescriptions projected at approximately historical levels of timber management.

Maximum Output, Even Flow Alternative - which provides for a maximum investment in timber management while adhering to even-flow management. This is considered the "maximum" output alternative.

Calculations: Developed and projected in FORPLAN computer program runs.

Assumptions:
(a) These three alternatives cover minimum, maximum and midpoint levels of timber output from the ONF and cover a wide-enough range to include all possible forest plan alternatives (yet to be finalized).
(b) Timber outputs from the watersheds on the ONF (developed in the forest plan) were lumped into two areas for socioeconomic.

Table 1a:
Socioeconomic Watershed Combos - FP

(1) Rest of Okanogan County -
   (a) Tonasket No. (TONNO)
   (b) Tonasket So. (TONSO)
   (c) Toasts Coulee (TTSCO)
   (d) Salmon Creek (SALCR)

(2) Methow Valley -
   (a) Lower Methow (LOMET)
   (b) Middle Methow (MDMET)
   (c) Lower Chewack (LOCWK)
   (d) Upper Chewack (UPCWK)
   (e) Pasayten River (PSYRV)
   (f) Lost River (LSTRV)
   (g) Upper Methow (UPMET)
   (h) Twisp River (TWPRV)
   (i) Granite Creek (GRNCR)
   (j) Upper Skagit (UPSKG)

Table 1b: Forest Plan Alternative Summary - Timber Output
Alternative: Current Level

Watershed/Period*	Cubic Feet (MM's)*					Board Feet (MM's)*				
	1	2	3	4	5	1	2	3	4	5
Rest of Okanogan County:										
Tonasket No.	35.9	19.7	26.7	44.0	31.2					
Tonasket So.	35.6	18.4	42.6	50.2	35.6					
Toats Coulee	0.8	0.6	0.5	--	--					
Salmon Creek	2.1	2.1	5.2	1.7	1.2					
Sub Total	74.4	40.8	75.0	95.9	68.0	388.4	213.0	391.5	500.6	355.0
Methow Valley:										
Lower Methow	18.4	42.2	19.4	40.7	50.9					
Middle Methow	7.6	10.1	5.5	2.6	8.1					
Lower Chewack	9.4	12.4	29.6	--	--					
Upper Chewack	10.5	10.3	1.9	0.9	0.6					
Pasayten River	--	--	--	--	--					
Lost River	--	--	--	--	--					
Upper Methow	13.2	13.4	16.6	2.9	3.1					
Twisp River	21.3	25.6	6.9	11.7	24.0					
Granite Creek	--	--	--	--	--					
Upper Skagit	--	--	--	--	--					
Sub Total	80.4	114.0	79.9	58.8	86.7	419.7	595.1	417.1	306.9	452.6
Total O.N.F.	154.8	154.8	154.9	154.7	154.7	808.1	808.1	806.6	807.5	807.5

*Notes: a) Periods - 1: 1981-1990
2: 1991-2000
3: 2001-2010
4: 2011-2020
5: 2021-2030

b) Custodial Alternative has no O.N.F. Timber Outputs.

c) Board ft. calculations:
Bf. Timber for Period 1=807.9bf/154.87ft.^{3}=5.22bf/ft.^{3}

Table 1c: Forest Plan Alternative Summary - Timber Output*
Alternative: Max. Timber Output, Even Flow

Watershed/Period*	Cubic Feet (MM's)*					Board Feet (MM's)				
	1	2	3	4	5	1	2	3	4	5
Rest of Okanogan County:										
Tonasket No.	17.0	27.6	64.9	9.6	43.6					
Tonasket So.	22.8	25.0	77.8	88.2	64.2					
Toats Coulee	8.1	0.5	0.1	4.6	--					
Salmon Creek	13.3	4.6	42.6	35.6	38.7					
Sub Total	61.2	57.7	185.4	138.0	146.5	315.2	297.2	954.8	710.7	754.5
Methow Valley:										
Lower Methow	30.5	15.2	42.5	59.4	68.7					
Middle Methow	7.9	26.8	18.4	8.2	11.4					
Lower Chewack	27.8	73.7	58.4	16.3	33.8					
Upper Chewack	11.2	43.9	13.0	0.3	9.5					
Pasayten River	--	--	--	--	--					
Lost River	--	--	--	--	--					
Upper Methow	26.8	23.8	17.3	32.7	27.6					
Twisp River	22.2	12.0	16.4	29.4	45.9					
Granite Creek	57.2	40.4	0.9	10.2	10.0					
Upper Skagit	--	--	--	--	--					
Sub Total	183.6	235.8	166.9	156.5	206.9	945.5	1214.4	859.5	806.0	1065.5
Total O.N.F.	244.8	293.5	352.3	294.5	353.4	1260.7	1511.5	1817.3/1516.7/1820.1		

*Note: a) Periods - 1: 1981-1990
2: 1991-2000
3: 2001-2010
4: 2011-2020
5: 2021-2030

b) Custodial Alternative has no O.N.F. Timber outputs.

c) Board ft. calculations:
Bf. Timber for Period 1=1259.6bf./244.7ft.^{3}=5.15bf./ft.^{3}

Estimations of Effects: The Methow Valley and the rest of Okanogan County. This is based on the Social Network Analysis (SNA) (Hutchins, Feb. 1981), which established that these two areas function as socio-economic subsystems within the primary zone of influence (Okanogan County), as identified in the Socioeconomic Assessment (SEA) (Hutchins, June 1981). Each area also has distinct milling centers (Twisp and Omak), and "Okanogan County is nearly a closed system as far as current harvesting and processing of timber are concerned." (Bolsinger, 1975).

Step 2: Develop total forest product industry employment for each of the alternative levels of timber output (Tables 2a-c): Calculations: Forest Industry Employment = Timber Consumption (or Output) x Employment/Wood consumption Ratios

Assumptions:

(a) All timber outputs from various sources within the county will be purchased and ultimately processed (at the primary level) within the county (see above). Therefore, forest industry employment in Okanogan County is assumed to be directly dependent upon timber outputs and all such employment is captured by the county labor force with no labor force migrational changes due to changes from county-wide timber outputs.

(b) County timber outputs are sold and consumed at rates projected to 2030 based on the regional projections developed by Haynes, Connaughton and Adams (March 1980), which are based on projected underlying regional demand for forest products. These demands were further based on these author's projections of casual factors of demand (such as housing).

(c) Employment: Wood consumption ratios are based on current east-side ratios developed by Wall (Nov. 1979), and were projected at rates developed by Bolsinger (1975). Wall's ratios were selected over Bolsinger's because they are the latest available.

(d) Relative projected amounts of timber from all other county sources will follow the projections given in SEA Table 62.

Table 2a: Total Forest Products Industry Employment Added

Alternative: Custodial

Period	Projected Aver. Annual Timber Con.[1]				Emp.-Wood Consump. Ratios[6]		Projected Employment from Timber Consumption[7]											
							O.N.F., County			O.N.F., Methow			O.N.F., Total			All Other		Total
	O.N.F. County[2]	O.N.F. Methow[3]	O.N.F. Total[4]	All Other Total[5]	Log-ging	Lumber & Wood Pro.	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Emp., All Added
1 (1981-1990)	0	0	0	102.1	1.59	4.83	--	--	--	--	--	--	--	--	--	162.3	493.1	655.4	655.4
2 (1991-2000)	0	0	0	102.8	1.5[illegible]	4.03	--	--	--	-	--	--	--	--	--	156.3	414.3	570.6	570.6
3 (2001-2010)	0	0	0	112.5	1.47	3.38	--	--	--	--	--	--	--	--	--	165.4	380.3	545.7	545.7
4 (2011-2020)	0	0	0	115.7	1.40	2.72	--	--	--	--	--	--	--	--	--	162.0	314.7	476.7	476.7
5 (2021-2030)	0	0	0	119.7	1.37	2.22	--	--	--	--	--	--	--	--	--	164.0	265.7	429.7	429.7

Notes:

1/ Assumes all timber made available for sale will be sold and processed. Also assumes that all timber is consumed inside county (primary zone of influence) per p. 8 of Timber Resources and the Timber Economy of Okanogan County, Wa. (Bolsinger, 1975).

2/ O.N.F. County: All watersheds on O.N.F. less those in Methow. Specifically: Tonasket No., Tonasket So., Toats Coulee, Salmon Creek.

3/ All Methow Valley Vicinity Watersheds on O.N.F., specifically: Lower, Middle and Upper Methow; Lower and Upper Chewack; Pasayten River: Lost River; Twisp River; Granite Creek; Upper Skagit.

4/ Sum of timber outputs by watershed.

5/ From SEA Table 62, less O.N.F. timber consumed and projected to 2030 based on Haynes, Connaughton and Adams (Mar., 1980) trends (shown in SEA Figure 35).

6/ From Table 66, SEA, using Wall's Ratios (Nov. 1979) projected at Bolsinger's Rates (1975).

7/ Employment = Consump. x Employ./Wood Consumption Ratios

Other Assumptions: a) Relative amounts from all other sources will remain constant as projected in SEA Table 62, b) Regional demand as projected by Haynes, Connaughton and Adams (Mar., 1980) remain the same, c) total employment from O.N.F. timber will be captured by county labor force (no imports).

Table 2b: Total Forest Products Industry Employment Added

Alternative: Current Level

Period	Projected Aver. Annual Timber Con.[1]				Emp.-Wood Consump. Ratios[6]		Projected Employment from Timber Consumption[7]												Total
							O.N.F., County			O.N.F., Methow			O.N.F., Total			All Other			
	O.N.F. County[2]	O.N.F. Methow[3]	O.N.F. Total[4]	All Other Total[5]	Log-ging	Lumber & Wood Pro.	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Emp., Al Added
1 (1981-1990)	38.8	42.0	80.8	102.1	1.59	4.83	61.7	187.4	249.1	66.8	202.9	269.7	128.5	390.3	518.8	162.3	493.1	655.4	1174.2
2 (1991-2000)	21.3	59.5	80.8	102.8	1.52	4.03	32.4	85.8	118.2	90.4	239.8	330.2	122.8	325.6	448.4	156.3	414.3	570.6	1019.0
3 (2001-2010)	39.2	41.7	80.9	112.5	1.47	3.38	57.6	132.5	190.1	61.3	140.9	202.2	118.9	273.4	392.3	165.4	380.3	545.7	938.0
4 (2011-2020)	50.1	30.7	80.8	115.7	1.40	2.72	70 1	136.3	206.4	43.0	83.5	126.5	113.1	219.8	332.9	162.0	314.7	476.7	809.6
5 (2021-2030)	35.5	45.3	80.8	119.7	1.37	2.22	48.6	78.8	127.4	62.1	100.6	162.7	110.7	179.4	290.1	164.0	265.7	429.7	719.8

Notes:

1/ From Table 1b, Forest Plan Alternative Summary. Assumes all timber made available for sale will be sold and processed. Also assumes that all timber is consumed inside county (primary zone of influence) per p. 8 of Timber Resources and the Timber Economy of Okanogan County, Wa. (Bolsinger, 1975).

2/ O.N.F. County: All watersheds on O.N.F. less those in Methow. Specifically: Tonasket No., Tonasket So., Toats Coulee, Salmon Creek.

3/ All Methow Valley Vicinity Watersheds on O.N.F., specifically: Lower, Middle and Upper Methow, Lower and Upper Chewack; Pasayten River; Lost River; Twisp River; Granite Creek; Upper Skagit.

4/ Sum of timber outputs by watershed.

5/ From SEA Table 62, less O.N.F. timber consumed and projected to 2030 based on Haynes, Connaughton and Adams (Mar., 1980) trends (shown in SEA Figure 35).

6/ From Table 66, SEA, using Wall's Ratios (Nov. 1979) projected at Bolsinger's Rates (1975).

7/ Employment = Consump. x Emp./Wood Consump. Ratios

Other Assumptions: a) Relative amounts from all other sources will remain constant as projected in SEA Table 62, b) Regional demand as projected by Haynes, Connaughton and Adams (Mar. 1980) remain the same, c) total employment from O.N.F. timber will be captured by county labor force (no imports).

Table 2c: Total Forest Products Industry Employment Added

Alternative: Maximum Timber Output, Even Flow

Period	Projected Aver. Annual Timber Con.[1]				Emp.-Wood Consump. Ratios[6]		Projected Employment from Timber Consumption[7]												
							O.N.F., County			O.N.F., Methow			O.N.F., Total			All Other			Total
	O.N.F. County[2]	O.N.F. Methow[3]	O.N.F. Total[4]	All Other Total[5]	Log-ging	Lumber & Wood Pro.	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Log-ging	Lumber & Wood Pro.	Total	Emp., All Added
1 (1981-1990)	31.5	94.6	126.1	102.1	1.59	4.83	50.1	152.1	202.2	150.4	456.9	607.3	200.5	609	809.5	162.3	493.1	655.4	1464.9
2 (1991-2000)	29.7	121.4	151.2	102.8	1.52	4.03	45.1	119.7	164.8	184.5	489.2	673.7	229.6	608.9	838.5	156.3	414.3	570.6	1409.1
3 (2001-2010)	95.5	86.0	181.4	112.5	1.47	3.38	140.4	322.8	463.2	126.4	290.7	417.1	266.8	613.5	880.3	165.4	380.3	545.7	1426
4 (2011-2020)	71.1	80.6	151.7	115.7	1.40	2.72	98.5	193.4	292.9	112.8	219.2	332.0	212.3	412.6	624.9	162.0	314.7	476.7	1101.6
5 (2021-2030)	75.5	106.6	182.0	119.7	1.37	2.22	103.4	167.6	271.0	146.0	236.7	382.7	249.4	404.3	653.7	164.0	265.7	429.7	1083.4

Notes:

1/ From Table 1c, Forest Plan Alternative Summary. Assumes all timber made available for sale will be sold and processed. Also assumes that all timber is consumed inside county (primary zone of influence) per p. 8 of Timber Resources and the Timber Economy of Okanogan County, WA. (Bolsinger, 1975).

2/ O.N.F. County: All watersheds on O.N.F. less those in Methow. Specifically: Tonasket No., Tonasket So., Toats Coulee, Salmon Creek.

3/ All Methow Valley vicinity watersheds on O.N.F., specifically: Lower, Middle and Upper Methow; Lower and Upper Chewack; Pasayten River; Lost River; Twisp River; Granite Creek; Upper Skagit.

4/ Sum of timber outputs by watershed.

5/ From SEA Table 62, less O.N.F. timber consumed and projected to 2030 based on Haynes, Connaughton and Adams (Mar., 1980) trends (shown in SEA Figure 35).

6/ From Table 66, SEA, using Wall's Ratios (Nov. 1979) projected at Bolsinger's rates (1975).

7/ Employment = Consump. x Emp./Wood Consump. Ratios

Other Assumptions: a) Relative amounts from all other sources will remain constant as projected in SEA Table 62, b) Regional demand as projected by Haynes, Connaughton and Adams (Mar., 1980) remain the same, c) total employment from O.N.F. timber will be captured by county labor force (no imports).

Step 3: Develop total personal income and total population effected by added forest products employment (Tables 3a-c):

Calculations:

(a) Total Personal Income = Emp. from timber consumption (Tables 2a-c) x Forest Industry Wages/Worker. Wages per worker were calculated from Bolsinger's (1975) total wage projections, updated to 1979 dollars. Projections beyond 2000 employed linear regressions.

(b) Total pop. effected (not added to pop., but within pop.) = Employment Added x Persons/Household. Projected persons/household are from SEA Table 19.

Table 3a: Projected Total Personal Income and Total Population Effected by Added Forest Products Employment
Alternative: Custodial

Period	Employ. from Timber Consumption[1]				Projected For. Ind.[2] Wage/Worker	Total Forest Industry Wages[3]					Projected Persons per Household[4]	Popu. Effected by Added For. Prod. Emp.[5]				
	O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other		O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total All		O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total All
1 (1981-1990)	--	--	--	655.4	17.059	--	--	--	11,180.5	11,180.5	2.72	--	--	--	1783	1783
2 (1991-2000)	--	--	--	570.6	19.697	--	--	--	11,239.1	11,239.1	2.64	--	--	--	1506	1506
3 (2001-2010)	--	--	--	545.7	22.519	--	--	--	12,288.6	12,283.6	2.59	--	--	--	1413	1413
4 (2011-2020)	--	--	--	476.7	26.433	--	--	--	12,600.6	12,600.6	2.53	--	--	--	1206	1206
5 (2021-2030)	--	--	--	429.7	30.150	--	--	--	12,955.5	12,955.5	2.47	--	--	--	1061	1061

Notes: 1/ From Table 2a .

2/ Calculated from SEA Tables 66 and 67 and updated to 1979 dollars ($1000's)

3/ Calculated by multiplying employment added x for. industry wage/worker

4/ From SEA Table 19, projected to 2030 using linear regression.

5/ Calculated by multiplying employment added x persons per household

Table 3b: Projected Total Personal Income and Total Population Effected by Added Forest Products Employment
Alternative: Current Level

Period	Emp. from Timber Consump.[1] O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Projected For. Ind.[2] Wage/Worker	Total Forest Ind. Wages[3] O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total, All	Projected Persons Per Household[4]	Popu. Effected by Added For. Pro. Emp.[5] O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total All
1 (1981-1990)	249.1	269.7	518.8	655.4	17.059	4249.40	4600.81	8850.2	11,180.5	20,030.7	2.72	678	734	1412	1783	3195
2 (1991-2000)	118.2	330.2	448.4	570.6	19.697	2328.2	6503.9	8832.1	11,239.1	20,071.2	2.64	312	872	1184	1506	2690
3 (2001-2010)	190.1	202.2	392.3	545.7	22.519	4280.9	4553.3	8834.2	12,288.6	21,122.8	2.59	492	524	1016	1413	2429
4 (2011-2020)	206.4	126.5	332.9	476.7	26.433	5455.8	3343.8	8799.6	12,600.6	21,400.2	2.53	522	320	842	1206	2048
5 (2021-2030)	127.4	162.7	290.1	429.7	30.150	3841.1	4905.4	8746.5	12,955.5	21,702	2.47	315	402	717	1061	1778

Notes: [1] From Table 2b.

[2] Calculated from SEA Tables 66 and 67 and updated to 1979 dollars ($1000's)

[3] Calculated by multiplying employment added x for. industry wage/worker ($1000's)

[4] From SEA Table 19, projected to 2030 using linear regression.

[5] Calculated by multiplying employment added x persons per household

Table 3c: Projected Total Personal Income and Total Population Effected by Added Forest Products Employment
Alternative: Maximum Timber Output, Even Flow

Period	Employ. from Timber Consumption[1]				Projected[2] For. Ind. Wage/Worker	Total Forest Industry Wages[3]					Projected Persons per Household[4]	Popu. Effected by Added For. Prod. Emp.[5]				
	O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other		O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total All		O.N.F. County	O.N.F. Methow	O.N.F. Total	All Other	Total All
1 (1981-1990)	202.2	607.3	809.5	655.4	17.059	3449.3	10,359.9	13,809.2	11,180.5	24,898.7	2.72	550	1652	2202	1783	3985
2 (1991-2000)	164.8	673.7	838.5	570.6	19.697	3246.1	13,269.9	16,516	11,239.1	27,755.1	2.64	435	1779	2214	1506	3720
3 (2001-2010)	463.2	417.1	880.3	545.7	22.519	10,430.8	9,392.7	19,823.5	12,288.6	32,112.1	2.59	1200	1080	2280	1413	3693
4 (2011-2020)	292.9	332.0	624.9	476.7	26.433	7,742.2	8,775.8	16,518	12,600.6	29,118.6	2.53	741	840	1581	1206	2787
5 (2021-2030)	271.0	382.7	653.7	429.7	30.150	8,170.7	11,538.4	19,709.1	12,955.5	32,664.6	2.47	669	945	1614	1061	2675

Notes: 1/ From Table 2c .

2/ Calculated from SEA Tables 66 and 67 and updated to 1979 dollars ($1000's)

3/ Calculated by multiplying employment added x for.industry wage/worker

4/ From SEA Table 19, projected to 2030 using linear regression

5/ Calculated by multiplying employment added x persons per household

Step 4: Project Gammas to Period 5 (Table 4a):

Calculations: Gammas = Nonbasic employment/personal income divided by 1000. Projections to 2020 decade were developed using linear regressions based on decades 1990-2010. Earlier years in the Methow Valley were slightly higher due to the influence of the North Cascades Highway.

Assumptions:

(a) The gammas were developed for The Social and Economic Effects of the Proposed Ski Development (April 1981) using county-wide data originally developed by the Bureau of Economic Analysis (BEA). The decade 1980-1990 gammas were not used because they were slightly higher than county-wide averages due to the effects of the North Cascades Highway. Thereafter, the gammas and each respective non-basic economic sector apply county-wide.

(b) "Non-basic sectors" are those segments of the county economy which are influenced by increases in personal income at the county level. That is, they are primarily effected (or stimulated/depressed) by changes in money flow injected from expenditures from wages earned by local forest industry employees.

(c) The concept of "gammas" was originally developed by Mountain West Research, Inc. for the U.S. Bureau of Reclamation (undated, USDI). Therefore, these gammas by non-basic (or local) economic sector are considered to be applicable county-wide, though they were initially developed for a project proposal centered in the Methow Valley.

Table 4a: Gammas, Okanogan County/Methow Valley, Baseline Projections[a]

	1975	1980	1985	1990	1995	2000	2005	2010	2020[c]
Services	.00324	.00320	.00311	.00299	.00290	.00282	.00273	.00265	.00247
Construction	.00129	.00130	.00122	.00114	.00109	.00103	.00098	.00093	.00082
Trade	.00262	.00358	.00361	.00360	.00365	.00368	.00371	.00374	.00381
F.I.R.E.[b]	.00095	.00130	.00132	.00130	.00132	.00134	.00134	.00135	.00137
Government	.00476	.00439	.00389	.00341	.00305	.00272	.00241	.00214	.00147

[a](Gammas = Non-basic employment/personal income divided by 1,000)

See text for explanation of Gammas. Calculated by Social Impact Research Inc. originally for Methow Valley, but based on county-wide data (Re: The Social and Economic Effects of the Proposed Ski Development at Early Winters, pps. 3-34 to 3-46, April 81).

[b]Finance-insurance-real estate.

[c]Projections for 2020 were added using linear regressions based on decades 1990, 2000 and 2010 (earlier years in Methow slightly higher than county due to effects of North Cascades Highway.

References: ____. April 1981. The Social and Economic Effects of the Proposed Ski Development at Early Winters, Vol. I. Social Impact Research Inc., Seattle, Wa. for U.S. Forest Service; Region 6, Portland, Or.

____. Undated. Spatial Interaction and the Economic Hierarchy in the Western United States. USDI, Bureau of Reclamation, Engineering and Research Center, Denver, Co. Prepared by Mountain West Research Inc., Tempe, Az. 31 pp.

Step 5: Aggregate Baseline Employment Projections by Non-Basic/Basic Sectors, then determine the amount of secondary non-basic employment added from forest products personal income, and finally subtract the secondary non-basic employment added by forest products personal income added (Tables 5a-c):

Calculations:

(a) Aggregates the categories given in SEA Table 48 into economic sectors comparable to the non-basic sectors developed in Table 4a (above). (Table 5a).

(b) Next baseline total income from forest industry wages is multiplied by each gamma to determine the baseline employment added to the local economy by forest products personal income (Table 5b).

(c) Then these employment numbers are subtracted from the baseline projections to isolate the baseline employment projections that are not effected by forest industry employment/income/production (Table 5c). These residual levels of employment are called "basic" employment sectors and are defined as those sectors of the economy dependent on infusions of capital from outside the local zone of influence. For example, both agriculture and forest products employment are primarily basic as they depend primarily on demand at regional, or even national levels, or sectors primarily dependent on sources outside of Okanogan County. When non-basic (or local derived) employment is subtracted from each respective economic sector, what remains is the employment dependent primarily on basic (or non-local) income sources.

Therefore, Table 5c includes only that employment dependent on basic and non-basic income flowing from economic income generators other than the forest products industry. This information is used in Steps 7a-c.

Table 5a: Employment Projections by Sector - Okanogan County[1/]

Sector	1980	1990	2000	2010	2020
Agriculture	1475	1275	1150	975	813
Non-Agriculture Self-Employ.[2/]	925	900	900	900	900
Other Non-Ag. Emp.: (mining, food & kindred other man.; transpor tation)	525	575	625	675	725
Construction	700	775	800	858	908
Forest Products (Lbr. & Wood)[5/]	1350	1100	875	675	500
Trade (Wholesale & Retail)	2875	3900	4750	5717	6654
F.I.R.E.[3/]	275	325	375	425	475
Services[4/]	2100	3600	4675	6033	7321
Government	2775	3200	3550	3950	4338
Total Employ., All Sectors	13000	15650	17700	20208	22634

Notes: [1/] Based on SEA Table 48 with linear trends estimated for 2010 and 2020.

[2/] Includes individual proprietors.

[3/] Finance, Insurance and Real Estate.

[4/] Includes recreation employment.

[5/] Forest products for 2010 and 2020 is projected using a curvalinear relationship (non-linear) based on historical trends.

Table 5b: Secondary Non-Basic (local) Employment Added from Basic (non-local) Forest Products Personal Income,[1] by Sector

For. Pro. Employ. / Income Per Wkr.	1350	17.059	1100	19.697	875	22.519	675	26.433	500	30.150
Non-Basic (local) Sector	1980		1990		2000		2010			2020
Services	73.4		65.0		56.3		47.6			36.2
Construction	30.7		25.6		20.3		15.9			12.1
Trade	81.9		78.8		72.1		66.1			57.3
F.I.R.E.[2]	30.7		27.6		27.0		23.8			21.1
Government	100.6		74.8		54.0		37.0			21.1

Notes: [1] Calculated by multiplying respective Gammas (Table 4a) x Forest Prod. Employment (Table 5a) x Income Per. Forest Worker (Tables 3a-c).

[2] Finance, Insurance and Real Estate.

Table 5c: Non Forest Product Related Employment Projections[4]

Sector	1990	1990	2000	2010	2020
Agriculture	1475	1275	1150	975	813
Non-Agriculture, Self Employ.[2]	925	900	900	900	900
Other Non-Agri. Employ.: (mining, food, kindred, other manf., transportation)	525	575	625	675	725
Construction	669	749	780	842	896
Forest Products (Lbr. & Wood)[5]	N/A	N/A	N/A	N/A	N/A
Trade (Wholesale & Retail)	2793	3821	4678	5651	6597
F.I.R.E.[3]	244	297	348	401	454
Services[4]	2027	3535	4619	5985	7285
Government	2674	3125	3446	3913	4317

Notes: [1] Calculated by subtracting Forest Prod. related employment in Table 5b from projected employment in Table 5a.

[2] Includes individual proprietors

[3] Finance, Insurance and Real Estate

[4] Includes recreation

[5] Removed element of For. Prod. to isolate that emp. not stimulated by historical/projected for. prod. outputs.

Step 6: Calculate the Secondary Non-Basic (or local) employment added from basic or non-local) forest products income, by economic sector (Tables 6a-c):

Calculations: Calculated by multiplying each respective gamma (Table 4a) by the Total Forest wages added (Tables 3a-c) for each alternative.

Table 6a: Secondary Non-Basic (local) Employment Added from Basic (non-local) Forest Products Personal Income,[1/] by Sector

Alternative: Custodial

Non-Basic (local) Sector	1980	1990	2000	2010	2020
Services	35.8	33.6	34.7	33.4	32.0
Construction	14.5	12.8	12.7	11.7	10.6
Trade	40.0	40.5	45.2	47.1	49.4
F.I.R.E.[2/]	14.5	14.6	16.5	17.0	17.7
Government	49.1	38.3	33.4	27.0	19.0

Notes: [1/] Calculated by multiplying respective Gammas (Table 4a) x Total Forest Wages (1979 $'s)

[2/] Finance, Insurance and Real Estate.

Table 6b: Secondary Non-Basic (local) Employment Added from Basic (non-local) Forest Products Personal Income,[1/] by Sector

Alternative: Current

Non-Basic (local) Sector	1980	1990	2000	2010	2020
Services	64.1	60.0	59.6	56.7	53.6
Construction	26.0	22.9	21.8	19.9	17.8
Trade	71.7	72.3	77.7	80.0	82.7
F.I.R.E.[2/]	26.0	26.1	28.3	28.9	29.7
Government	87.9	68.4	57.5	45.8	31.9

Notes: [1/] Calculated by multiplying respective Gammas (Table 4a) x Total Forest Wages (1979 $'s).

[2/] Finance, Insurance and Real Estate.

Table 6c: Secondary Non-Basic (local) Employment Added from Basic (non-local) Forest Products Personal Income,[1/] by Sector

Alternative: Maximum Timber Output, Even Flow

Non-Basic (local) Sector	1980	1990	2000	2010	2020
Services	79.7	83.0	90.6	77.2	80.7
Construction	32.4	31.6	33.1	27.1	26.8
Trade	89.1	99.9	118.2	108.9	124.5
F.I.R.E.[2/]	32.4	36.1	43.0	39.3	44.8
Government	109.3	94.6	87.3	62.3	48.0

Notes: [1/] Calculated by multiplying respective Gammas (Table 4a) x Total Forest Wages (1979 $'s).

[2/] Finance, Insurance, and Real Estate.

Step 7: Calculate the projected employment structure for Okanogan County (Tables 7a-7c):

Calculations: Calculated by adding non-forest products related employment (Table 5c) and secondary employment stimulated by varying forest products outputs, as stimulated by changes in timber output from the O.N.F. (Tables 6a-c):

Table 7a: Projected Employment Structure, Okanogan County[1/]

Alternative: Custodial

Sector	1980	1990	2000	2010	2020
Agriculture	1475	1275	1150	975	813
Non-Agriculture, Self-Employ.[2/]	925	900	900	900	900
Other Non-Agri. Employ.: (mining, food, kindred, other manf., transportation)	525	575	625	675	725
Construction	684	762	793	854	907
Forest Products (Lbr. & Wood)[5/]	655	571	546	477	430
Trade (Wholesale & Retail)	2833	3861	4723	5698	6646
F.I.R.E.[3/]	259	312	365	418	472
Services[4/]	2063	3569	4654	6018	7317
Government	2723	3163	3529	3940	4336
Total Employment	12,142	14,988	17,285	19,955	22,536

Notes:

1/ Calculated by adding Non-Forest Prod. Related Employ. Proj. (Table 5c) and employment stimulated by forest products outputs by Alternative (Tables 6a-c).

2/ Includes individual proprietors.

3/ Finance, Insurance and Real Estate

4/ Includes recreation

5/ Forest Products derived in Tables 2a-c

Table 7b: Projected Employment Structure, Okanogan County[1/]

Alternative: Current

Sector	1980	1990	2000	2010	2020
Agriculture	1475	1275	1150	975	813
Non-Agriculture, Self-Emp.[2/]	925	900	900	900	900
Other Non-Agri. Emp.: (mining, food, kindred, other manf., transportation)	525	575	625	675	675
Construction	695	772	802	862	914
Forest Products (Lbr. & Wood)[5/]	1174	1019	938	810	720
Trade (Wholesale & Retail)	2865	3893	4756	5731	6680
F.I.R.E.[3/]	270	323	376	430	484
Services[4/]	2091	3595	4679	6042	7339
Government	2762	3193	3554	3959	4349
Total Employment	12,782	15,545	17,780	20,384	22,924

Notes:

1/ Calculated by adding Non-Forest Prod. Related Employment Proj. (Table 5c) and employment stimulated by forest products outputs by Alternative. (Tables 6a-c).

2/ Includes individual proprietors

3/ Finance, Insurance and Real Estate

4/ Includes recreation

5/ Forest Products derived in Tables 2a-c.

Table 7c: Projected Employment Structure, Okanogan County[1/]

Alternative: Maximum Timber Output, Even Flow

Sector	1980	1990	2000	2010	2020
Agriculture	1475	1275	1150	975	813
Non-Agriculture, Self-Emp.[2/]	925	900	900	900	900
Other Non-Agri., Employ.; (mining, food, kindred, other manf., transportation)	525	575	625	675	625
Construction	701	781	813	869	923
Forest Products (Lbr. & Wood)[5/]	1465	1409	1426	1102	1083
Trade (Wholesale & Retail)	2882	3921	4796	5760	6722
F.I.R.E.[3/]	276	333	391	440	499
Services[4/]	2107	3618	4710	6062	7366
Government	2783	3220	3583	3975	4365
Total Employment	13,139	16,032	18,394	20,758	23,396

Notes:

1/ Calculated by adding Non-Forest Prod. Related Employment Projections (Table 5c) and employment stimulated by forest products outputs by Alternative (Tables 6a-c).

2/ Includes individual proprietors

3/ Finance, Insurance and Real Estate

4/ Includes recreation

5/ Forest products derived in Tables 2a-c

Step 8: Calculate the projected potential labor force, total employed, total unemployed and unemployment rates as stimulated by various levels of timber outputs from the O.N.F.:

Calculations:

(a) Potential Labor Force = (Total Employ. by Household (Table 48 in SEA and Table 5a) - (1- unemployment rate)

(b) Total employed by sector are the totals developed in Tables 7a-c.

(c) Number unemployed = PLF - Total Employ. by Sectors

(d) Unemployment Rates = $\frac{\text{No. unemployed}}{\text{PLF}} \times 100$

Assumption: An assumption in calculating total employment by sector is that one person does not hold two (or more) jobs. Double counting probably does occur, especially in the agriculture, forest prod., trade and services sectors, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic. Therefore, estimates of unemployment may be understated to some degree.

Table 8a: Projected Potential Labor Force, Total Employed, Total Unemployed, Unemployment Rates[1/]

Alternative: Custodial

	1980	1990	2000	2010	2020
Total Employ. by Household[2/]	12,800	15,450	17,500	20,008	22,434
Projected Unemploy. Rate[2/]	11.4%	8.7%	7.8%	7.5%	7.4%
Potential Labor Force[3/]	14,447	16,922	18,981	21,630	24,227
Total Employ. by Sectors[4/]	12,142	14,988	17,285	19,955	22,546
Number Unemployed[5/]	2,305	1,934	1,696	1,675	1,681
Unemployment Rate (%)[6/]	16.0%	11.4%	8.9%	7.7%	6.9%

Notes:

1/ From Table 48 in SEA with unemployment rates for 2010-2020 projected using a curvelinear relationship.

2/ From SEA Table 48 and Table 5a

3/ Calculation: $\text{Potential Labor Force (PLF)} = \frac{\text{Total Employ. by Household}}{\text{1- unemployment rate}}$

4/ From Tables 7a-c

5/ No. Unemployed = PLF - Total Employ. by Sectors

6/ $\text{Unemployment Rate (\%)} = \frac{\text{No. Unemployed}}{\text{PLF}} \times 100$

*An assumption in calculating total employment by sector is that one person does not hold two (or more) jobs. Double counting probably does occur, especially in the agriculture, forest prod., trade and services sectors, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic. Therefore, estimates of unemployment may be understated to some degree.

Table 8b: Projected Potential Labor Force, Total Employed, Total Unemployed, Unemployment Rates[1/]

Alternative: Current

	1980	1990	2000	2010	2020
Total Employ. by Household[2/]	12,800	15,450	17,500	20,008	22,434
Projected Unemploy. Rate[2/]	11.4%	8.7%	7.8%	7.5%	7.4%
Potential Labor Force[3/]	14,447	16,922	18,981	21,630	24,227
Total Employ. by Sectors[4/]	12,782	15,545	17,780	20,384	22,924
Number Unemployed[5/]	1,665	1,377	1,201	1,246	1,303
Unemployment Rate (%)[6/]	11.5%	8.1%	6.3%	5.8%	5.4%

Notes:

1/ From Table 48 in SEA with unemployment rates for 2010-2020 projected using a curvelinear relationship.

2/ From SEA Table 48 and Table 5a

3/ Calculation: $\text{Potential Labor Force (PLF)} = \frac{\text{Total Employ. by Household}}{\text{1- unemployment rate}}$

4/ From Tables 7a-c

5/ No. Unemployed = PLF - Total Employ. by Sectors

6/ $\text{Unemployment Rate (\%)} = \frac{\text{No. Unemployed}}{\text{PLF}} \times 100$

*An assumption in calculating total employment by sector is that one person does not hold two (or more) jobs. Double counting probably does occur, especially in the agriculture, forest prod., trade and services sectors, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic. Therefore, estimates of unemployment may be understated to some degree.

Table 8c: Projected Potential Labor Force, Total Employed, Total Unemployed, Unemployment Rates[1/]

Alternative: Maximum Timber Output, Even Flow

	1980	1990	2000	2010	2020
Total Employ. by Household[2/]	12,800	15,450	17,500	20,008	22,434
Projected Unemploy. Rate[2/]	11.4%	8.7%	7.8%	7.5%	7.4%
Potential Labor Force[3/]	14,447	16,922	18,981	21,630	24,227
Total Employ. by Sectors[4/]	13,139	16,032	18,394	20,758	23,396
Number Unemployed[5/]	1,308	890	587	872	831
Unemployment Rate (%)[6/]	9.1%	5.3%	3.1%	4.0%	3.4%

Notes:

1/ From Table 48 in SEA with unemployment rates for 2010-2020 projected using a curvelinear relationship.

2/ From SEA Table 48 and Table 5a

3/ Calculation: $\text{Potential Labor Force (PLF)} = \frac{\text{Total Employ. by Household}}{\text{1- unemployment rate}}$

4/ From Tables 7a-c

5/ No. Unemployed = PLF - Total Employ. by Sectors

6/ $\text{Unemployment Rate (\%)} = \frac{\text{No. Unemployed}}{\text{PLF}} \times 100$

*An assumption in calculating total employment by sector is that one person does not hold two (or more) jobs. Double counting probably does occur, especially in the agriculture, forest prod., trade and services sectors, but it is assumed to be insignificant. The severity of this problem is unknown because there is no data available about the magnitude of this characteristic. Therefore, estimates of unemployment may be understated to some degree.

Step 9: Summarize the above calculations in Tables which compare board feet of O.N.F. timber output/with each measure. Then graph the relationships (Tables 1-5, Figures 1-14, main section).

Calculations: Summarized and graphed from each table above. These tables and figures are presented in the main body of this report. Note that the calculations were developed so that each graph is universally applicable to whatever levels of timber outputs are ultimately formed into Forest Plan alternatives. For example, Figure 9a shows the range of forest industry employment in Okanogan County that is directly added by MM board foot outputs from the Methow Valley portion of the O.N.F., for five decades, beginning with the 1980-1990 decade (period 1) and ending with the 2020-2030 decade (period 5). The graphs are also designed to be used with any combination of forest watersheds.